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ABSTRACT

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Both Llaser printers and Iinkjet printers have undergone many improvements in the last 10 years — mainly becoming faster and with better resolutions, and with prices going down all the time. However, one of the biggest limitations of all these types of printers has remained the same all the time: They print just on one side of the page. Although some printers on the market have an optional additional unit for mechanically flipping pages over, these units are typically cumbersome, expensive, and require extra space. Also, with mechanical flipping there is a higher chance for various malfunctions. Being able to efficiently print on both sides of the page can have many advantages: Saving paper costs, saving trees, saving office space or home space, being able to double the printing speed, being able to easily print eBooks, and more. The present invention tries to solve the various problems of being able to print simultaneously on both sides of the paper without slowing down the printing process and without having to mechanically flip the pages, so that practically the printing speed is more or less doubled. The solution is in principle similar in both inkjet and laser printers, although there are some variations that stem from the different mechanisms between these two main types of printers. In Bboth types of printers and in other printers the main principle is using a second printing element simultaneously at the other side of the page, either at exactly the same position on the paper, or with a preferably slight shift between the two positions. The present invention solves all the relevant problems for each type of printer and covers many possible variations, including variations where cheap and efficient automatic folding of papers is used for printing eBooks. It also shows many improvements over other patents that tried to solve the problem without flipping the pages. Another important feature of the patent is a variation where a laser printer is combined for example with inkjet printheads, preferably after the paper exits the fixing elements of the laser - which has a lot of advantages and great price-performance, and also various problems have to be solved in order to enable this, especially if used in combination with simultaneous double-side printing. This way the user can print for example all the black text (and preferably also for example texts that were completely or mostly in a single other color) through the laser unit and any additional needed colors (preferably images, and elements in the text that are in different color) can be added by the inkjet printheads.